

New Claims

1) A process for preparing (meth)acrylic esters (F) containing urethane groups by

5 c) reacting an alcohol (C) containing urethane groups with (meth)acrylic acid or an ester of (meth)acrylic acid with a saturated alcohol (D), and

 d) if desired, working up the reaction mixture from c), which comprises

conducting the reaction c) in the presence of an enzyme (E).

10 2) A process as claimed in claim 1, wherein the enzyme (E) is a lipase, esterase or protease.

15 3) A process as claimed in claim 1 or 2, wherein the conversion in stage c) is set to at least 95%.

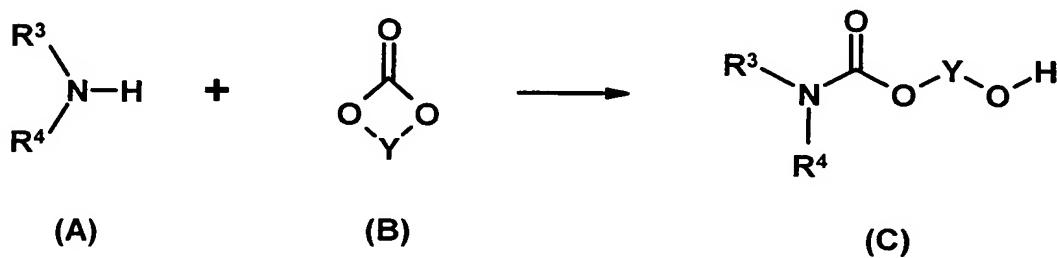
20 4) A process as claimed in any of the preceding claims, wherein the reaction c) is conducted at from 20 to 80°C.

25 5) A process as claimed in any of the preceding claims, wherein the alcohol (C) containing urethane groups is obtainable by

 a) reacting an amine (A) with a carbonate (B), and

 b) if desired, working up the reaction mixture obtainable from a).

6) A process as claimed in claim 5, wherein the alcohol (C) containing urethane groups is obtainable by a reaction thus



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in which

5 R³, R⁴ independently are hydrogen, C₁–C₁₈ alkyl, C₂–C₁₈ alkyl uninterrupted or interrupted by one or more oxygen and/or sulfur atoms and/or by one or more substituted or unsubstituted imino groups, or are C₂–C₁₈ alkenyl, C₆–C₁₂ aryl, C₅–C₁₂ cycloalkyl or a five- to six-membered heterocycle containing oxygen, nitrogen and/or sulfur atoms, it being possible for each of the radicals stated to be substituted by aryl, alkyl, aryloxy, alkyloxy, heteroatoms and/or heterocycles, or are a group of the formula -[X_i]_k-H,

10 Y is C₂–C₂₀ alkylene or C₅–C₁₂ cycloalkylene or is C₂–C₂₀ alkylene which is interrupted by one or more oxygen and/or sulfur atoms and/or by one or more substituted or unsubstituted imino groups and/or by one or more cycloalkyl, -(CO)-, -O(CO)O-, -(NH)(CO)O-, -O(CO)(NH)-, -O(CO)- or -(CO)O- groups, it being possible for each of the radicals stated to be substituted by aryl, alkyl, aryloxy, alkyloxy, heteroatoms and/or heterocycles,

15 k is a number from 1 to 50, and

20 X_i for i = 1 to k can be selected independently from the group consisting of -CH₂-CH₂-O-, -CH₂-CH₂-N(H)-, -CH₂-CH₂-CH₂-N(H)-, -CH₂-CH(NH₂)-, -CH₂-CH(NHCHO)-, -CH₂-CH(CH₃)-O-, -CH(CH₃)-CH₂-O-, -CH₂-C(CH₃)₂-O-, -C(CH₃)₂-CH₂-O-, -CH₂-CH₂-CH₂-O-, -CH₂-CH₂-CH₂-CH₂-O-, -CH₂-CHVin-O-, -CHVin-CH₂-O-, -CH₂-CHPh-O-, and -CHPh-CH₂-O-, where Ph stands for phenyl and Vin stands for vinyl.

25 7) (Meth)acrylic esters containing urethane groups and obtainable by

30 a) reacting a polyethyleneimine, a hydrogenated polyacrylonitrile, a straight-chain, branched or dendritic polymer having amino functions or an at least partly hydrolyzed poly-N-vinylformamide having a weight-average molecular weight M_w of from 200 to 1 000 000 with a carbonate (B) at a temperature of from 0 to 120°C,

35 b) if desired, working up the reaction mixture obtainable from a),

 c) reacting the reaction mixture from a) or b) with (meth)acrylic acid or with an ester of (meth)acrylic acid with a saturated alcohol (D) in the presence of an enzyme (E), and

d) if desired, working up the reaction mixture from c).